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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/759,582	01/16/2004	John Thomas Mariner	US 131067-2 60QZ	7994

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EXAMINER	
DHINGRA, RAKESH KUMAR	
ART UNIT	**PAPER NUMBER**
1763	

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	03/12/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary	Application No.	Applicant(s)	
	10/759,582	MARINER ET AL.	
	Examiner	Art Unit	
	Rakesh K. Dhingra	1763	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *08 January 2007*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-9 and 11-26* is/are pending in the application.

4a) Of the above claim(s) *18-26* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-9 and 11-17* is/are rejected.

7)☒ Claim(s) *1* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *01/07*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 1/8/07 has been entered.

Claim Objections

Claim 1 is objected to because of the following informalities:

In terms of CFR 1.121(c)2, "the text of any added subject matter must be shown by underlining the added text".

In this case the amended claim 1 does not indicate the newly added limitation "wherein the graphite shaft and the graphite platform form a single unitary body" by underlining.

Appropriate correction is required.

Response to Arguments

Applicant's arguments with respect to claims 1-17 have been considered but are moot in view of the new ground(s) of rejection as explained hereunder.

Rejections of Claims 1-5, 7-9, 11 :

1) Rejection as anticipated by Masuda et al (2004/0107865)

Applicant has amended independent claim 1 by adding limitation "wherein the graphite shaft and the graphite platform form a single unitary body". Further, applicant has cancelled claim 10.

Applicant argues that Masuda et al does not disclose the now added claim limitation "wherein the graphite shaft and the graphite platform form a single unitary body".

Examiner responds that shaft 11 (electrode) and the platform are both made from graphite and it would be obvious to have these parts as a unitary body, absent any critically disclosed by the applicant. The motivation for this would be body to obtain easier alignment between shaft and the platform, and also depending upon complexity of the relevant parts and economies of scale. Accordingly claim 1 and dependent claims 2-5, 7-9, 11 have been rejected under 35 USC 103 (a) as explained below.

Further, claims 1-5, 7-9 have also been rejected under 35 USC 103 (a) by combining new reference Flanigan et al (US Patent No. 6-81,414) with Honma et al and MacLeish et al as explained below. Remaining dependent claims 6, 12, 13, 15-17 have also been rejected as explained below.

In response to applicant's argument about claims 13, 14 that Kirchner is a non-analogous art, examiner responds that Kirchner is directed towards ion beam apparatus for semiconductor processing operations like thin film deposition and ion implantation, which is analogous to the field of endeavor of the present invention which is also apparatus for semi-conductor manufacturing operations. Thus claim 14 has ben rejected under 35 USC 103 (a) as explained below.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1-5, 7-9, and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Masuda (US 2003/0107865).

Regarding Claim 1: Masuda discloses a wafer processing device comprising: a platform for supporting an object to be heated, the platform comprises a substrate having upper and lower relatively

flat surfaces, the platform is comprised of graphite (Fig. 1 Item 5, Paragraph 36); a graphite electrode 11 (like a shaft) shaft extending substantially transverse to the platform (Fig. 4 Item 11), [Paragraph 76 Lines 1-12]; a first coating on at least one of the flat surfaces (Fig. 1 Item 2), with said first coating Fig. 1 Item 2) composed of a nitride (Paragraph 36 Lines 2-6 and Paragraph 5); a second coating (Figure 1 Item 3) layer composed of pyrolytic graphite (Paragraph 36 Lines 2-6) disposed on the first coating in a patterned arrangement of predetermined geometry (Fig. 1 Item 4, Paragraph 5), the layer having at least two separate ends adapted for forming at least an electrode (Fig. 1 Item 3, Paragraph 36); and a top coating (Fig. 1 Item 4) of a dielectric material superimposed on said first and second coatings (Fig. 1 Item 4), the top coating is composed of a nitride (Paragraph 42 and 5). Though Masuda et al do not explicitly teach that graphite shaft and graphite platform form a single unitary body, it is known in the art to integrate individual parts (especially when made from same material), as a single unitary part to obtain easier alignment between shaft and the platform, and also depending upon complexity of the relevant parts and economies of scale (column 13, lines 56 – 65).

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to use the platform and the shaft as a single unitary body in the apparatus of Masuada et al to obtain better alignment between shaft and the platform, and also depending upon complexity of the relevant parts and economies of scale

In this case courts have ruled (Case law):

"Making elements integral was held to have been obvious. *Nerwin v. Erlichman* 168 USPQ 177 (PO BdPatApp 1969); *In re Wolfe* 116 USPQ 443 (CCPA 1958); *In re Howard* 150 US 164 (USSC 1893)".

Regarding Claim 2: Masuda discloses the device is an electrostatic chuck and the electrode is a chuck electrode (Paragraph 6).

Regarding Claim 3: Masuda discloses the device is a heater and the electrode is a heating element electrode (Paragraph 6).

Regarding Claim 4: Masuda discloses the graphite platform is one of a disk, platen, and a cylinder (Fig. 1, Paragraph 36).

Regarding Claim 5: Masuda discloses the graphite shaft is one of a rod and a hollow core (Fig. 4 Item 11).

Regarding Claim 7: Masuda discloses the patterned second coating is formed on said lower surface of said platform (Fig. 1 Item 3).

Regarding Claim 8: Masuda discloses the said pyrolytic graphite second coating layer is encapsulated in a nitride (Fig. 1 Item 4, Paragraph 5).

Regarding Claim 9: Masuda discloses the said pyrolytic graphite second coating layer is encapsulated in pyrolytic boron nitride (Fig. 1 Item4, Paragraph 42 Lines 1-5).

Regarding Claim 11: Masuda discloses the graphite shaft further inherently includes at least two electrical conductors for connecting the electrode to an external source of power (Fig. 5 Item 11), since the electrode needs to be connected to an external power supply through the shaft, for the device to function according to how it is presented in Fig. 5.

Claim 1-5, 7-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Honma et al (US Patent No. 5,478,436) in view of Flanigan et al (US Patent No. 6,081,414) and MacLeish et al (US Patent No. 6,113,984).

Regarding Claims 1, 4: Honma et al teach an apparatus (Figure 3) for use in plasma processing comprising:

a chuck (platform)10 for supporting a wafer (object) 14, the platform comprises a substrate (body of disc shape) 21 having upper and lower relatively flat surfaces, the platform is comprised of graphite;

a first coating 23 of boron nitride formed on at least one of the flat surfaces;

electrodes 24a, 24b (second coating layer) composed of pyrolytic graphite disposed on the first coating and formed by masking and etching (in a patterned arrangement of predetermined geometry), the layer having at least two separate ends adapted for forming at least an electrode; and

a coating (third top coating) 26 of boron nitride (dielectric material) superimposed on said first and second coatings (column 3, line 45 to column 4, line 20).

Honma et al do not teach a shaft extending substantially transverse to the platform, the shaft comprised of graphite and wherein the graphite shaft and graphite platform form a single unitary body.

Flanigan et al teach an apparatus (Figure 1) comprising a pedestal assembly 104 (including an electrostatic chuck 105) supported by a shaft 126 (column 3, lines 30-60).

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to use a shaft with the wafer supporting platform in the apparatus of Honma et al as taught by Flanigan et al to enable contain wiring for DC supply for electrostatic chucking.

Honma et al in view of Flanigan et al do not teach the shaft comprised of graphite and wherein the graphite shaft and graphite platform form a single unitary body.

MacLeish et al teach an apparatus (Figure 14) that includes a support (platform) 115 with upper and lower flat surfaces and a shaft 116 that extends transverse to the platform. MacLeish et al further teach that the support 115 and the shaft 116 are made from graphite (column 13, lines 45-60). Though MacLeish et al do not explicitly teach that graphite shaft 116 (with arms 118) and susceptor 115 (platform) form a single unitary body, it is known in the art to integrate individual parts (especially when made from same material), as a single unitary part to obtain easier alignment between shaft and the platform, and also depending upon complexity of the relevant parts and economies of scale.

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to use the platform and the shaft (made of graphite) as a single unitary body in the apparatus of

Honma et al in view of Flanigan et al et al to obtain better alignment between shaft and the platform, and also depending upon complexity of the relevant parts and economies of scale

In this case courts have ruled (Case law):

"Making elements integral was held to have been obvious. *Nerwin v. Erlichman* 168 USPQ 177 (PO BdPatApp 1969); *In re Wolfe* 116 USPQ 443 (CCPA 1958); *In re Howard* 150 US 164 (USSC 1893)".

Regarding Claim 2: Honma et al teach that device 10 is an electrostatic chuck and the electrode 24a, 24b is chuck electrode.

Regarding Claim 3: Honma et al teaches that electrodes 25 may be used as heating element. Further, MacLeish et al teach that apparatus of Figure 14 can function as a device for heating the wafer by heating of susceptor 115 through radiant heating from lamps (Honma et al – column 4, lines 1-5 and MacLeish et al – Column 14, lines 5-25).

Regarding Claim 5: MacLeish et al teach that shaft 116 is of rod form (Figure 14 and column 13, line 56 to column 14, line 5).

Regarding Claim 7: Honma et al teach that patterned second coating 25a, 25b is formed on lower surface of body (platform) 21 (Figure 3).

Regarding Claims 8, 9: Honma et al teach that pyrolytic graphite coating 24a, 24b, 25a, 25b is encapsulated in a pyrolytic boron nitride coating 26 (Figure 3 and column 4, lines 5-20).

Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Honma et al (US Patent No. 5,478,436) in view of Flanigan et al (US Patent No. 6,081,414) and MacLeish et al (US Patent No. 6,113,984) as applied to Claim 1 and further in view of Chu et al (US 6,793,767).

Regarding Claim 6:Honma et al in view of Flanigan et al and MacLeish et al teach electrodes formed from pyrolytic graphite as a continuous elongated strip but do not teach that the strip arranged in at least one of electrical flow path has at least one of a spiral pattern, a serpentine pattern, a helical

pattern, a zigzag pattern, a continuous labyrinthine pattern, a spirally coiled pattern, a swirled pattern, a randomly convoluted pattern, and combinations thereof.

Chu et al teaches an apparatus (Figure 2) that includes electrostatic electrodes 104 arranged in a spiral pattern (Column 3 Lines 10-20). MacLeish et al, Honma et al and Chu et al are analogous art because they are from the same field of endeavor, namely substrate holding devices.

At the time of invention it would have been obvious to a person of ordinary skill in the art to form the pyrolytic graphite strip of Honma et al in view of Flanigan et al and MacLeish et al including the strip being arranged in at least one of electrical flow path to have a spiral pattern, in view of the teaching of Chu et al. The suggestion or motivation for doing so would have been to provide an electrode pattern capable of distributing the electrode evenly across the substrate.

Claim 11, 12, 15, 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Honma et al (US Patent No. 5,478,436) in view of Flanigan et al (US Patent No. 6,081,414) and MacLeish et al (US Patent No. 6,113,984) as applied to Claim 1 and further in view of Komino et al (US Patent No. 5,478,429).

Regarding Claims 11,12, 15: Honma et al in view of Flanigan et al and MacLeish et al teach shaft and electrode but do not teach graphite shaft includes at least two electrical conductors for connecting the electrode to an external source of power.

Komino et al teach an apparatus (Figure 2) that includes a susceptor 32 with an electrostatic chuck 33 that includes an electrode 34 and a pipe structure (like a shaft) 51, 52 where two electrical conductors 62 and the outer pipe 52 are used for connecting the electrode 34 to an external power source 63. Komino et al also teach that the two electrical conductors are concentric with first conductor 62 being disposed within the second conductor (pipe 52) [Figure 2 and column 4, line 10 to column 5, line 15].

It would have been obvious to a person of ordinary skill in the art to use two electrical conductors in the shaft as taught by Komino et al in the apparatus of Honma et al in view of Flanigan et al and MacLeish et al to enable supply electrical power to the electrode and connecting a lower electrode to an RF power supply without using a conventional coaxial cable, since coaxial cables require a cumbersome operation to connect a shielded line to a process chamber and the impedance of the apparatus may be change depending on the manner of connecting them.

Regarding Claim 16: Komino et al teach that the two electrical conductors 62, 52 have a common center (Figure 2).

Claim 13 is rejected under 35 U.S.C. 103(a) as being unpatentable over Honma et al (US Patent No. 5,478,436) in view of Flanigan et al (US Patent No. 6,081,414), MacLeish et al (US Patent No. 6,113,984) and Komino et al (US Patent No. 5,478,429) as applied to Claim 11 and further in view of of Parkhe et al (US Patent No. 6,535,372).

Regarding Claims 13: Honma et al in view of Flanigan et al, MacLeish et al and Komino et al teach all limitations of the claim including two electrical conductors but do not teach that two electrical conductors are disposed on opposite sides of the shaft

Parkhe et al teach a substrate support (Figure 1) comprising a pedestal 106 (which includes an electrostatic chuck 104) wherein two electrical conductors 118 are disposed on opposite sides of gas conduit 122 (like a shaft) [column 3, lines 15-40].

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to dispose two electrical conductors on opposite sides of the shaft as taught by Parkhe et al in the apparatus of Honma et al in view of Flanigan et al, MacLeish et al and Komino et al to equalize the electrostatic force on the wafer by compensating for any physical variation in distance between the pedestal and the electrical feed-through.

Claim 14 is rejected under 35 U.S.C. 103(a) as being unpatentable over Honma et al (US Patent No. 5,478,436) in view of Flanigan et al (US Patent No. 6,081,414), MacLeish et al (US Patent No. 6,113,984), Komino et al (US Patent No. 5,478,429) and Parkhe et al (US Patent No. 6,535,372) as applied to Claim 13 and further in view of Kirchner et al (US Patent No. 5,811,820).

Regarding Claim 14: Honma et al in view of Flanigan et al, MacLeish et al, Komino et al and Parkhe et al teach all limitations of the claim including a graphite shaft with two electrical conductors on opposite sides of the shaft but do not teach the electrical conductors are coated layers.

Kirchner et al teaches an ion source apparatus (Figure 22B) that includes a solid shaft 2202 coated with electrode layers 2206 and 2208 to enable supply RF power to the electrode sheets 2102 and where electrode 2206 is disposed opposite to electrode 2208 (Figure 22B and column 20, lines 8-20).

It would have been obvious to a person of ordinary skill in the art to form electrodes layers on the on the opposite sides of the shaft as taught by Kirchner et al in the apparatus of Honma et al in view of Flanigan et al, MacLeish et al, Komino et al and Parkhe et al to enable supply power as per configuration of the electrode plate to be connected to the shaft.

Claim 17 is rejected under 35 U.S.C. 103(a) as being unpatentable over Honma et al (US Patent No. 5,478,436) in view of Flanigan et al (US Patent No. 6,081,414), MacLeish et al (US Patent No. 6,113,984) and Komino et al (US Patent No. 5,478,429) as applied to Claim 11 and further in view of of Kushihashi (US 2003/0217767).

With respect to Claim 17: Honma et al in view of Flanigan et al, MacLeish et al and Komino et al teach all limitations of the claim except that the said first electrical conductor is in the form of a graphite rod, the second electrical conductor is a hollow graphite rod, and wherein the first and second electrical conductors are separated by means of a coating layer comprising a material selected from the group of least a nitride, carbide, carbonitride or oxynitride of elements selected from a group consisting of B, Al,

Si, Ga, refractory hard metals, transition metals, and rare earth metals, or complexes and/or combinations thereof.

Kushihashi discloses a first electrical conductor is in a form of a graphite rod (Fig. 2 Item 9 Paragraph 46), and a second electrical conductor is a hollow graphite rod (Fig. 2 Item 7 Paragraph 46), wherein the first and second electrical conductors are separated by means of a coating layer comprising the material pyrolytic boron nitride (Fig. 2 Item 8 Paragraph 46).

It would have been obvious to a person of ordinary skill in the art to form the first electrical conductors' configuration as taught by Kushihashi et al in the apparatus of Honma et al in view of Flanigan et al, MacLeish et al and Komino et al to enable provide power connection to the electrode with an excellent resistance to high temperatures (Paragraph 31 Lines1-4).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Rakesh K. Dhingra whose telephone number is (571)-272-5959. The examiner can normally be reached on 8:30 -6:00 (Monday - Friday).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Parviz Hassanzadeh can be reached on (571)-272-1435. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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